Rapid Watershed Assessment
Resource Profile
Red Lakes (MN) HUC: 9020302

Rapid watershed assessments provide initial estimates of where conservation investments would best address the concerns of landowners, conservation districts, and other community organizations and stakeholders. These assessments help land–owners and local leaders set priorities and determine the best actions to achieve their goals.

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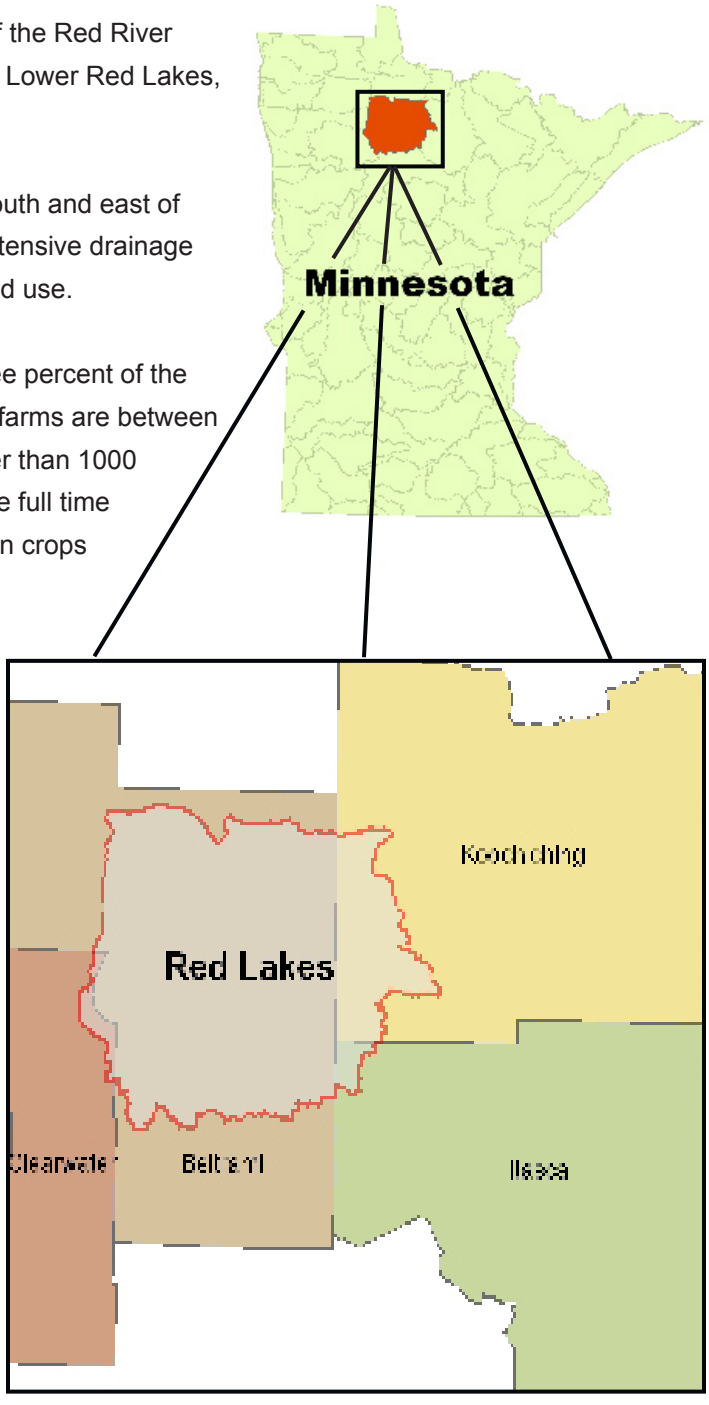
Introduction

The Red Lakes 8-digit Hydrological Unit Code (HUC) Subbasin is 1,263,678 acres in size. Located in Minnesota's Northern Wetlands and Northern Lakes and Forest Ecoregions and a portion of the Red River Valley Ecoregion, this watershed is home to Upper and Lower Red Lakes, the two largest bodies of water within the state.

While large areas of wetlands exist to the northwest, south and east of the open water of the Red Lakes, there are areas of extensive drainage northeast of Upper Red Lake facilitating agricultural land use.

There are 445 farms in the subbasin. About eighty three percent of the farms are less than 500 acres in size. Fifty eight of the farms are between 500 and 1000 acres (13%) and the remainder are larger than 1000 acres in size. Fifty two percent of the farm operators are full time producers and do not rely on off farm income. The main crops grown are small grains, soybeans, and forage crops. The pasture land is used primarily for beef and dairy.

Resource concerns include improved drainage for crop production, grazing management of forest and grassland, water/wind erosion and water quality impacts. Additional resource concerns include management of excessive wetness, short growing season, and pasture management.



County Totals

	Acres in HUC	*% HUC*
Beltrami	1,024,829.39	81.1
Clearwater	23,923.36	1.9
Itasca	21,063.54	1.7
Koochiching	193,861.24	15.3
Total acres:	**1,263,677.5**	**100**

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Physical Description

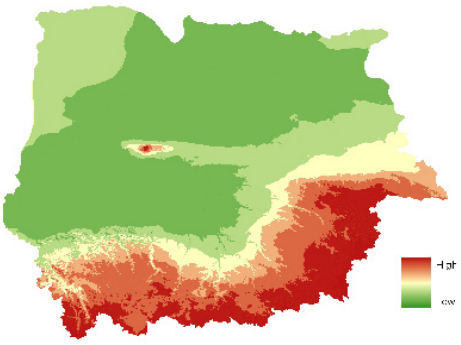
The watershed is by both flow volume and surface area the largest drainage basin of the Red River. Its major tributaries are the Red Lake River and Grand Marais Creek, which empty directly into the Red River; and the tributaries of the Red Lake River, including the Thief River, the Clearwater River, the Hill River, the Lost and the Poplar Rivers.

Average elevation in the watershed is 1145 feet above sea level, with the highest values being in the southern portions of the watershed, while the lowest are found across the central and northern regions dominated largely by open water and peatlands.

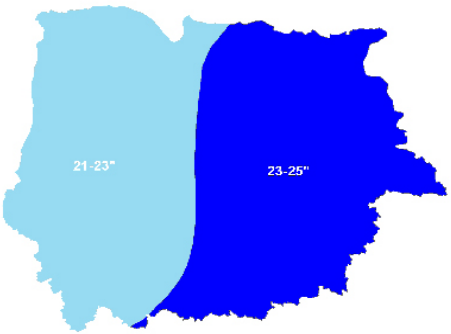
Precipitation in the watershed ranges from 21 to 25 inches anually. Most lands within this watershed are not highly erodible, and are well to moderately well suited to agricultural uses. Predominate land use / land cover is wetlands (45%), followed by open water (24%), and forest (20%).

Agricultural land use within the Red Lakes watershed accounts for approximately 12% of the available acres. Pasture/hay/grassland makes up 67% of cropland, Row crops make up approximately 15% of cropped lands, and small grains and grasslands enrolled in the Conservation Reserve Program (CRP) make up the majority of the balance.

Relief

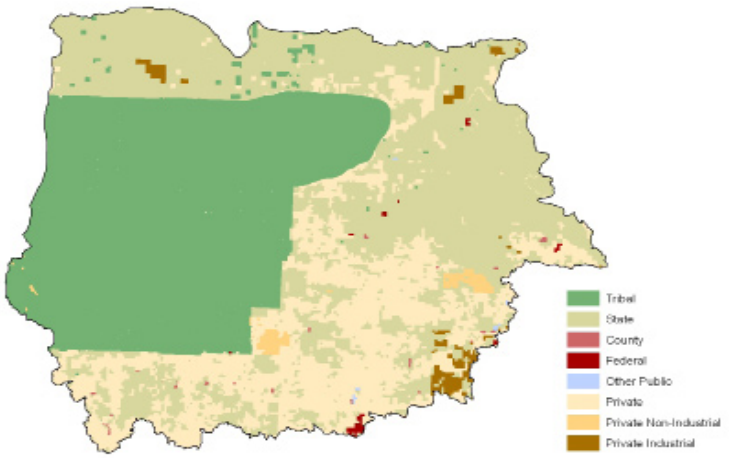


Average Precipitation (inches)



Ownership*[1]

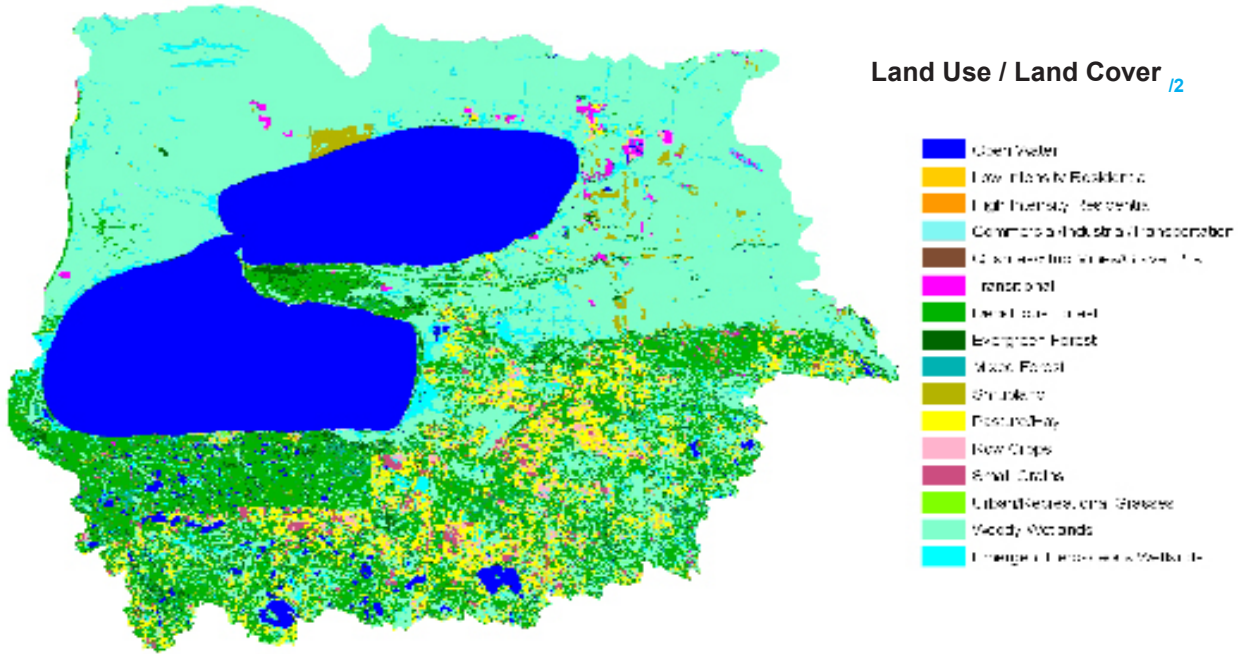
Ownership Type	Acres	% of HUC
Conservancy	0.00	0.00
County	1568.74	0.12
Federal	2,111.2	0.17
Private Major	22,674.8	1.79
State-Misc.	481,726.4	38.12
Other Public	620.18	0.05
Tribal	483,246.3	38.24
Private	271730.00	21.50
Ownership Totals:	**1,263,677.6**	**100**



* Ownership totals derived from 2007 MN DNR GAP Stewardship data and are the best suited estimation of land stewardship available on a statewide scale at time of publication. See the bibliography section of this document for further information.

Ownership / Land Use

The Red Lakes Watershed covers an area of 1,263,678 acres. Tribally owned or managed lands account for 38.24% (483,246.3 acres) of this HUC, followed closely by State owned lands, which account for 38.12% (481,726.4 acres). Privately owned lands comprise 21.5% (271,730 acres) of the area, followed by Private-Major with approximately 22,675 acres (1.79%). Federal Land holdings amount to 2,111 acres (0.17%), and County lands amount to approximately 1,569 acres (0.12%). The remainder is comprised of just over 620 acres of miscellaneous public lands, and ownership data indicates no major private conservancy landholdings within the basin. Land use by ownership type is represented in the table below.



Ownership / Land Use /3

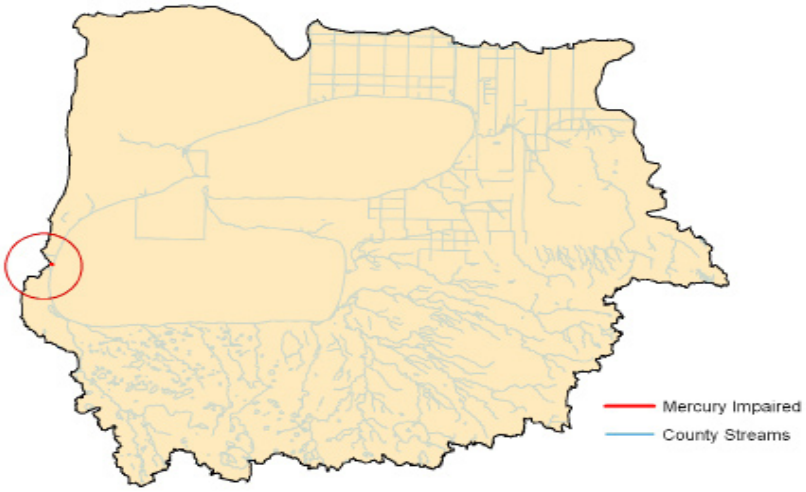
	Public		Private**		Tribal			
Landcover/Use	**Acres**	**Percent**	**Acres**	**Percent**	**Acres**	**Percent**	**Total Acres**	**Percent**
Forest	87,219.4	6.90	93,847.14	7.43	80,659.5	6.38	261726.04	20.71%
Grain Crops	189.7	0.02	12,214.68	0.97	160.7	0.01	12565.09	0.99%
Grass, etc	5,265.6	0.42	71,613.27	5.67	1,179.7	0.09	78058.59	6.18%
Orchards	0.0	0.00	0.00	0.00	0.0	0.00	0.00	0.00%
Row Crops	787.0	0.06	15,678.13	1.24	379.8	0.03	16844.85	1.33%
Shrub etc	11,392.0	0.90	4,364.04	0.35	5,635.0	0.45	21391.05	1.69%
Wetlands	377,637.0	29.88	83,646.56	6.62	106,778.2	8.45	568061.82	44.95%
Residential/Commercial	673.66	0.05	2,115.76	0.17	1298.42	0.10	4087.84	0.32%
Open Water*	--	--	--	--	286374.7	22.66	300941.15	23.81%
* ownership of non-tribal waters undetermined			** includes private-major					
Totals:	**483,164.34**	**38.23%**	**283,480**	**22.43%**	**482,466.1**	**38.18%**	**1263677.50**	**100.00%**

Physical Description (continued)

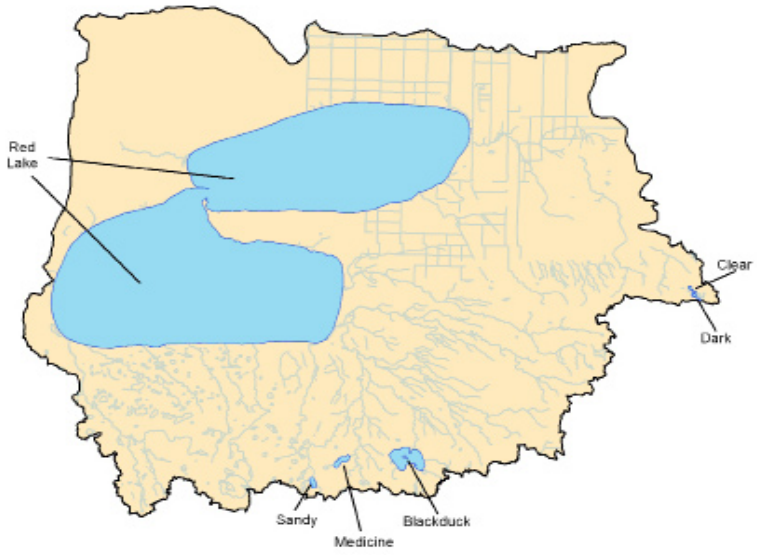
			cu. ft/sec	
Stream Flow Data	USGS 05074500 RED LAKE RIVER NEAR RED LAKE, MN	**2006 Avg.**	670.6	
		May – Sept. AVG	463.8	
Stream Data[4] *(*Percent of Total HUC Stream Miles)*		**ACRES/MILES**	**PERCENT**	
	Total Miles – Major (100K Hydro GIS Layer)	1,473	---	
	Total Miles –303d/TMDL Listed Streams	0.15	<.001%*	
Riparian Land Cover/Land Use[5] *(Based on a 100-foot buffer on both sides of all streams in the 100K Hydro GIS Layer)*	Dev/Barren	202.8	0.6	
	Fallow	0	0	
	Forest	6646.6	18.9	
	Grain Crops	187	0.5	
	Grass/Pasture	2697	7.7	
	Orchards/Vine	0	0	
	Row Crops	622	1.8	
	Shrub/Range	749.5	2.1	
	Water	5477	15.6	
	Wetlands	18,487	52.7	
	Total Buffer Acres	**35068.9**	---	
Crop and Pastureland Land Capability Class[6] *(Croplands & Pasturelands Only) (1997 NRI Estimates for Non-Federal Lands Only)*	**1** – slight limitations	0	0%	
	2 – moderate limitations	45,600	40%	
	3 – severe limitations	14,400	12.6%	
	4 – very severe limitations	50,200	44%	
	5 – no erosion hazard, but other limitations	0	0%	
	6 – severe limitations; unsuitable for cultivation; limited to pasture, range, forest	0	0%	
	7 – very severe limitations; unsuitable for cultivation; limited to grazing, forest, wildlife habitat	3,800	3.3%	
	8 – miscellaneous areas; limited to recreation, wildlife habitat, water supply	0	0%	
	Total Crop & Pastureland	**114,000**	---	
Irrigated Lands[7] *(1997 NRI Estimates for Non-Federal Lands Only)*	**TYPE OF LAND**	**ACRES**	**% of Irrigated Lands**	**% of HUC**
	Cultivated Cropland	**0**	**0%**	**0%**
	Uncultivated Cropland	**0**	**0%**	**0%**
	Pastureland	**0**	**0%**	**0%**
	Total Irrigated Lands	**0**	**0%**	**0%**

Assessment of Waters

Section 303(d) of the Clean Water Act states that water bodies with impaired use(s) must be placed on a state's impaired waters list. A water body is "Impaired" or polluted when it fails to meet one or more of the Federal Clean Water Act's water quality standards. Federal Standards exist for basic pollutants such as sediment, bacteria, nutrients, and mercury. The Clean Water Act requires the Minnesota Pollution Control Agency (MPCA) to identify and restore impaired waters.



2006 Listed Streams [8]	Impairment	Affected Use
Red Lake River Headwaters to Thief River	Mercury	Aquatic Consumption

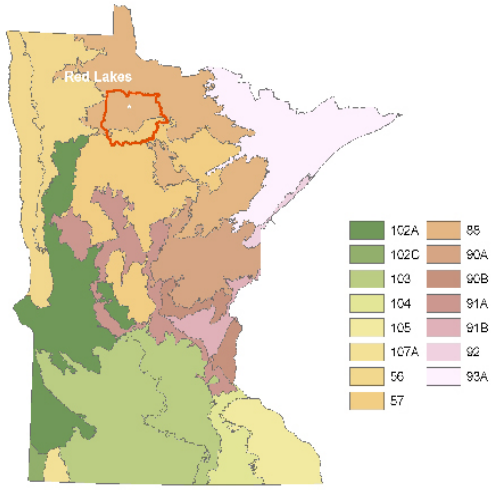


2006 Listed Lakes	Impairment	Affected Use
Red	Mercury	Aquatic Consumption
Blackduck	Mercury	Aquatic Consumption
Medicine	Mercury	Aquatic Consumption
Sandy	Mercury	Aquatic Consumption
Clear	Mercury	Aquatic Consumption
Dark	Mercury	Aquatic Consumption

Common Resource Areas

The Red Lakes Watershed is located within two common resource areas, CRA 57 and 88. [9]

57-Northern Minnesota Till Moraine: Rolling glacial moraine and associated outwash with short, choppy and complex slopes. Soils are generally loamy with some clayey and sandy soils included. Organic soils occur in depressions. Land use is cropland, pasture timber and recreation. Numerous lakes occur in this region. Main crops are small grain, soybeans and forage crops. Resource concerns include improved drainage for crop production, grazing management of forest and grassland, water and wind erosion and water quality impacts.



88-Northern Minnesota Glacial Lake Basins: Nearly level to gently sloping areas formed in lake washed till, lacustrine and organic soil material. Generally the soils are silty, clayey and loamy with small amounts of sandy and gravelly soils on beach ridges. Timber land is the main use. Scattered cropland and grazing land for beef and dairy are present. Cropland is used mostly for small grain, silage and hay. Resource concerns include management of excessive wetness, short growing season, pasture management, and water quality.

Only the major CRA units are described above. For further information, go to:
http://soils.usda.gov/survey/geography/cra.html

Soils / Geology

Soils at the mouth of the watershed consist primarily of glacial lake deposits of clay and silt. The central and far southeastern portions of the watershed contain mixed areas of till made up of clay, silt, sand, gravel, cobbles and boulders; and glacial lakeshore deposits of delta sand and gravel, beach sand and silty wetland depressions. The northeastern portion of the watershed contains mostly organic deposits of peat and muck in wetland areas, and also glacial lakeshore deposits as above.

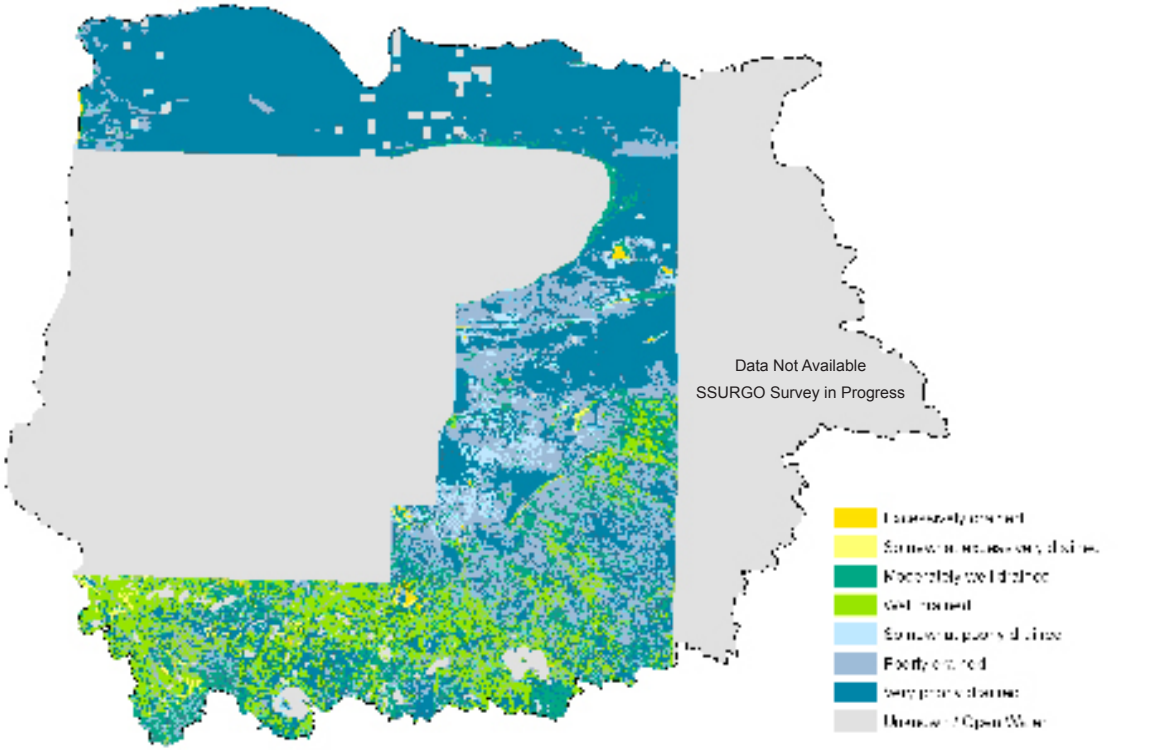
Soils in the headwaters of the watershed are black, limey, clayey soils with some clayey soils of the lakeplain. Further up the watershed the beach ridge contains sandy soils. The central portion of the watershed again continues the black, limey, clayey soils interrupted by the sands of the beach ridge. Organic soils are found just west and north of the Red Lakes. Lower Red Lake is surrounded by sandy soils. Lastly, the extreme southeast portion of the watershed is made up of rolling, wooded terrain with the soils and geomorphology typical of

Visit the online Web Soil Survey at http://websoilsurvey.nrcs.usda.gov for official and current USDA soil information as viewable maps and tables. Visit the Soil Data Mart at http://soildatamart.usda.gov to download SSURGO certified soil tabular and spatial data.

Drainage Classification

Drainage class (natural) refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil.

Seven classes of natural soil drainage are recognized–excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained. These classes are defined in the “Soil Survey Manual.”



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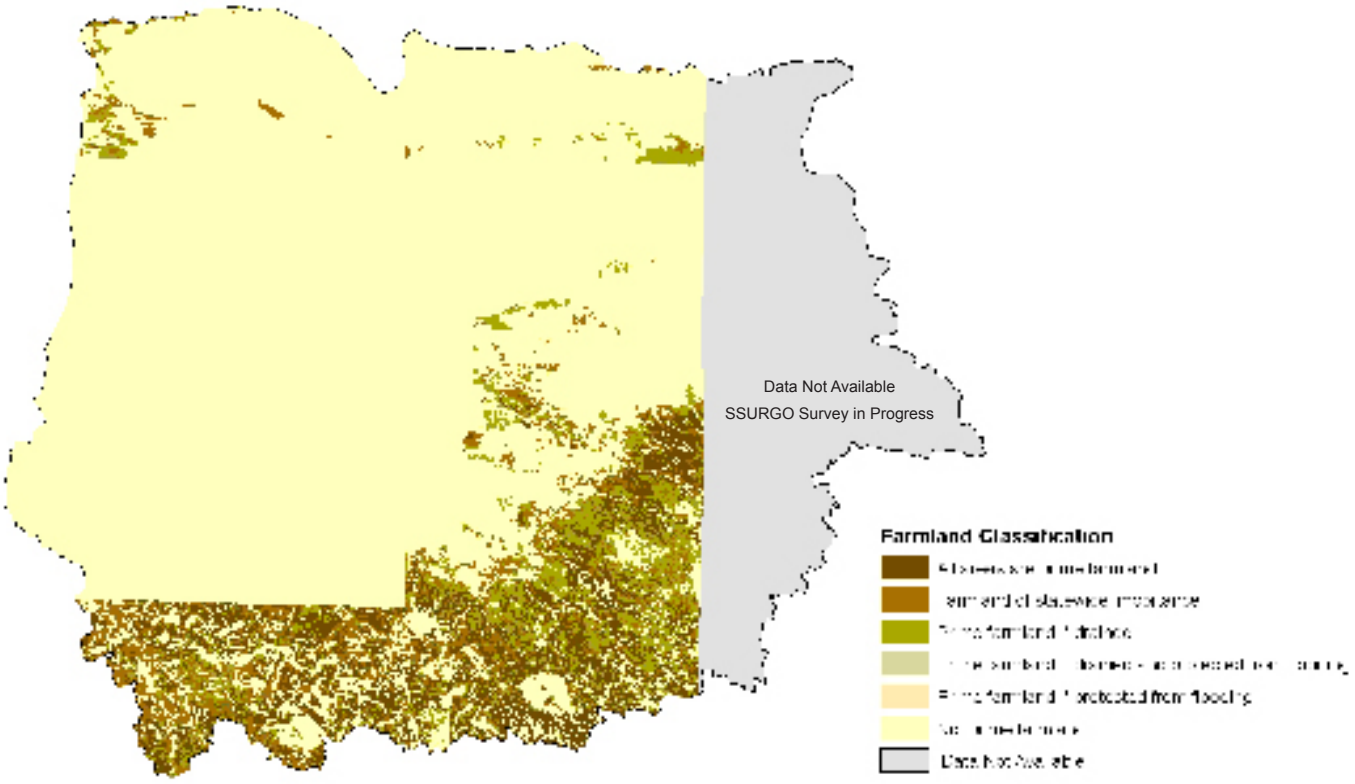
Farmland Classification

Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland.

Farmland classification identifies the location and extent of the most suitable land for producing food, feed, fiber, forage, and oilseed crops.

NRCS policy and procedures on prime and unique farmlands are published in the Federal Register, Vol. 43, No 21, January 31, 1978.



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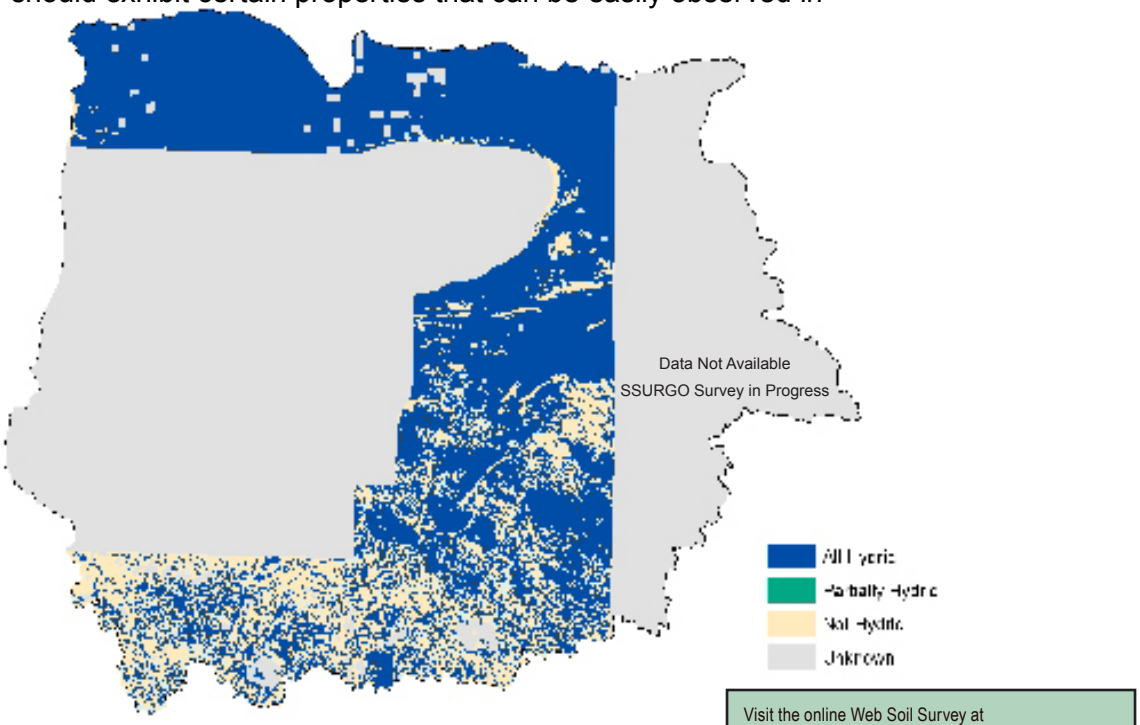
Hydric Soils

This rating provides an indication of the proportion of the map unit that meets criteria for hydric soils. Map units that are dominantly made up of hydric soils may have small areas, or inclusions of nonhydric soils in the higher positions on the landform. Map units of dominantly non–hydric soils may therefore have inclusions of hydric soils in the lower positions on the landform.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as “soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part” (Federal Register 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field.



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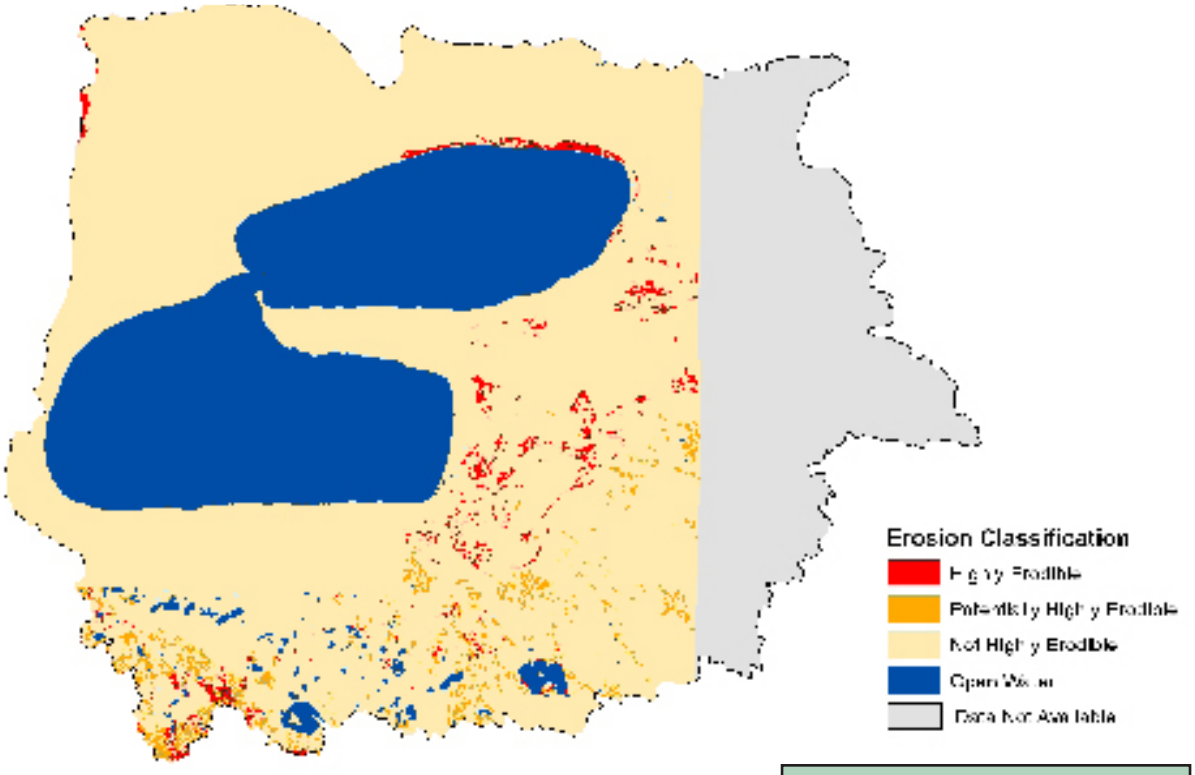
Highly Erodible Land (HEL)

The erodibility index (EI) for a soil map unit is determined by dividing the potential erodibility for the soil map unit by the soil loss tolerance (T) value established for the soil in the FOTG as of January 1, 1990.

A soil map unit with an EIof 8 or greater is considered to be highly erodible land (HEL).

Potential erodibility is based on default values for rainfall amount and intensity, percent and length of slope, surface texture and organic matter, permeability, and plant cover. Actual erodibility and EI for any specific map unit depends on the actual values for these properties.



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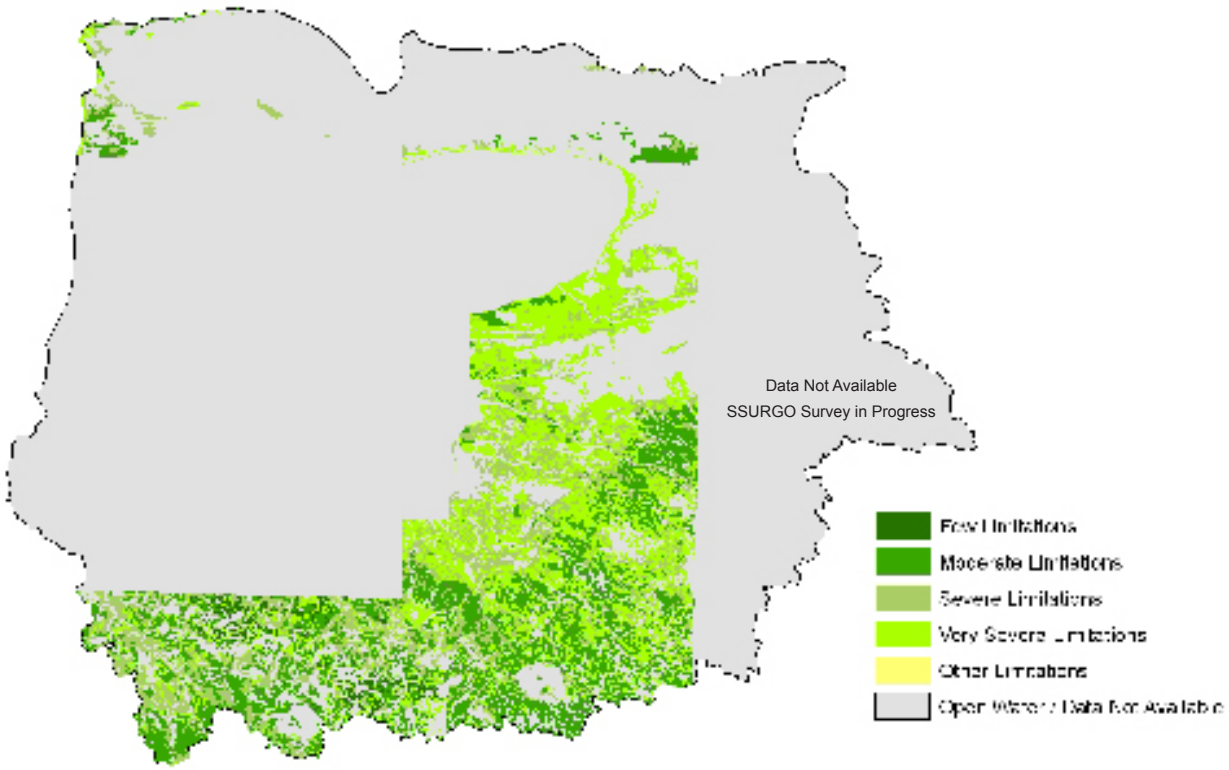
Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management.

The criteria used in grouping the soils does not include major and generally expensive land forming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forestland, or for engineering purposes.



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Performance Results System and Other Data

In the three year reporting period NRCS Conservation treatment practices applied or prescribed within the Red Lakes watershed have primarily concentrated on Prescribed Grazing (1,066 Acres/yr avg.), Conservation crop rotations (910 Acres/yr), Trees and Shrubs (319 Acres/yr), and WIldlife Habitat (100 Acres/yr). Other notable efforts have been made in areas of air quality/ wind erosion management, with the addition of nearly 3,400 feet of windbreak anually.

Conservation Treatment Acres	NRCS Practice Code	FY 04	FY 05	FY 06	Avg/Year	Total
Waste Management (Number)	313, 317, 359	0	0	0	0	0
Buffers (Acres)	391, 393	114	22	100	79	236
Erosion Control (Acres)	311, 332, 589, 386, 412, 600, 601, 603, 380, 650	0.94	0.46	1.1	1	2.5
Irrigation Water Management (Acres)	449	0	0		0	0
Wind Break (ft)	380	3825	1870	4485	3393	10180
Atmospheric Resource Quality Management (Acres)	370	0	0	0	0	0
Nutrient Management (Acres)	590	0	0	0	0	0
Pest Management (Acres)	595	6	0	0	2	6
Prescribed Grazing (Acres)	528, 472, 528A	162	1057	1978	1066	3197
Prescribed Burning (Acres)	338	0	0	0	0	0
Trees & Shrubs (Acres)	612, 666	864	22	72	319	958
Conservation Tillage (Acres)	329A, 329B, 329C	0	0	0	0	0
Conservation Crop Rotations (Acres)	328	0	443	2287	910	2730
Cover Crops (Acres)	340	0	0	0	0	0
Wildlife Habitat (Acres)	644, 645	38	92	169	100	299
Brush Management (Acres)	314	0	0	0	0	0
Restoration of Declining Habitat (Acres)	643	0	0	0	0	0
Wetland Wildlife Habitat Management (Acres)	644	0	0	0	0	0
Wetlands (Acres)	657, 658, 659	0	5	4	3	9

LANDS REMOVED FROM PRODUCTION THROUGH FARM BILL PROGRAMS/11	
Program	**Acres**
Conservation Reserve Program (CRP)	9,422
Wetland Restoration Program (WRP)	0
Conservation Reserve Enhancement Program (CREP)	0

Socioeconomic and Agricultural Data (Relevant)

The Red Lakes subbasin has a population of just under 23,000 people. Median household income throughout the district is nearly $34,000 yearly, roughly 73% of the national average. Sixty-five percent of the population over the age of 18 is active in the workforce, and approximately 14% of the residents in the watershed are below the national poverty level.

There are 445 farms in the subbasin. Approximately eighty-three percent of the farms are less than 500 acres in size. Fifty-eight of the farms are between 500 and 1000 acres (13%) and the remainder are larger than 1000 acres in size. Fifty two percent of the farm operators are full time producers and do not rely on off farm income.

Red Lakes (MN) HUC # 9020302 /12		
Population Data	Watershed Population	22,830
	Unemployment Rate	5.43%
	Median Household Income	33,825
	% below poverty level	14%
	Median Value of Home	77,083
Farms	# of Farms	445
	# of Operators	445
	# of Full Time Operators	233
	# of Part Time Operators	211
	Total Crop/Pasturelands	**114,000**
Farm Size	1 to 49 Acres	62
	50 to 179 Acres	157
	180 to 499 Acres	150
	500 to 999 Acres	58
	1,000 Acres or more	18
Livestock & Poultry	Cattle - Beef	12,870
	Cattle - Dairy	2,682
	Chicken	7,285
	Swine	372
	Turkey	43
	Other	1,880
	Animal Count Total:	**25,132**
	Total Permitted AFO's:	**79**
Chem (Acres Applied)	Insecticides	2009.5
	Herbicides	6094
	Wormicides	4.25
	Fruiticides	361.46
	Total Chemicals	8469.21
	% State Chemical Totals	**0.06%**

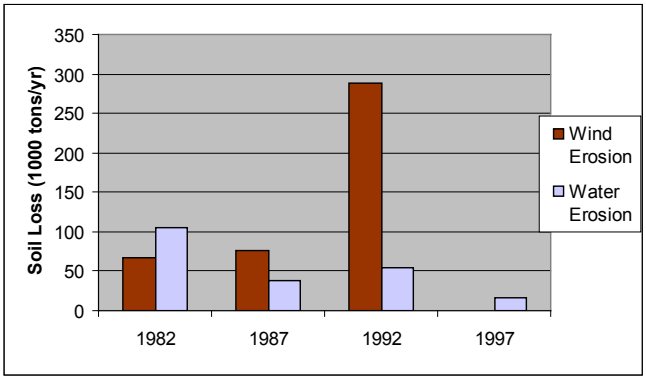
RESOURCE CONCERNS

Tribal and County Soil and Water Conservation Districts in the Red Lakes watershed have identified the following resource concerns as priorities for conservation and cost sharing efforts:

- Surface Water Quality on Red Lakes. Reduction of priority pollutants and sediments in surface waters is a priority issue. Excessive amounts of sediments, nutrients, and bacteria degrade the water quality causing an unbalanced fish community with depressed populations and limited diversity.
- Surface Water Management: Sediment control, stormwater management, optimization of water levels in Red Lakes. Drained wetlands, improper grazing, low water levels, aging dams, and dam discharge practices are diminishing surface water quality and suppressing fish populations. Restoration of wetlands, dam repair and improved discharge coordination will significatly improve vitality of the Red Lakes and efficiency of dam operations.
- Ground Water Quality, Nutrients, organics, animal and human waste. Aging septic systems, runoff and abandoned wells all pose significant threats to groundwater quality throughout the region. While drinking water quality of is the primary consideration, the quality of groundwater moving to lakes is also a concern.
- Aquatic Habitat improvement and mangement. Red lake water levels significantly affect fish propagation, lake access, and shoreline erosion. Fluctuating lake levels affect the vitality of spawning habitats and fish loss over dam structures.
- Marsh Restoration. Sedimentation has resulted in the loss of viable habitat for natural, economic and cultural resources including wild rice, fish and waterfowl, and furbearing animals. Though efforts are in place, additional practices are necessary to achieve a favorable balance between land use and biota in the region.

• NRI data trends indicate erosion by wind on the cropland and pastureland increased dramatically between the years1982 (67,500 tons/yr) and 1992 (289,200 tons/year). No values were reported for 1997.

• NRI estimates indicate water erosion on cropland fell by 84% between the years 1982 (104,700 tons) and 1997 (16,500 tons).



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Federally Listed Threatened And Endangered Species /14	
ENDANGERED SPECIES	**CANDIDATE SPECIES**
None	**None**
THREATENED SPECIES	**PROPOSED SPECIES**
Mammals- Canada lynx, Gray wolf **Birds- Bald eagle**	None
Essential Habitat - Mature forest near water for the Bald eagle Northern forested areas for the Canada Lynx and Gray Wolf	

Watershed Projects, Plans and Monitoring*

- Red Lakes Well Sealing Project. A continuation of efforts to help protect the shallow aquifer in the Red Lake – Redby areas on the Reservation. The practice is needed to seal unused drilled wells that connect directly to the main aquifer only 35 feet below the surface. Reservation efforts have been enhanced by support and funding provided through participation in the NRCS Environmental Quality Incentive Program

- "BIZHIBAYAASH" Circle of Flight Model Tribal Wetland And Waterfowl Enhancement Initiative. A joint effort by the Bureau of Indian Affairs, Minneapolis Area Reservations, the Environmental Protection Agency, 1854 Authority, U.S. Fish & Wildlife Service, the North American Waterfowl Management Plan, and the Inter-Tribal Organizations of Native American Fish & Wildlife Society and the Great Lakes Indian Fish and Wildlife Commission.

- Red Lakes DNR Forestry Program. Supplemented with NRCS EQUIP funding, the tribe is successfullly conducting a wide perspective of forest redevelopment activities including seed collection and propagation methods, alternative site preparation methods (such as anchor-chaining and prescribed burns), pine plantation methods, and timber stand improvement (TSI) methods.

- Red Lake Wildlife Habitat Preservation and Maintenance, Enhancement and Evaluation Project, Red Lakes DNR, US Fish and Wildlife Service.

- Big Bog State Park Project, Upper Red Lake Area Association. This project is intended to stimulate the economy, and provide enhanced public appreciation and long-term protection of the Red Lake Peatlands. The Red Lake Peatlands, also known as the Big Bog are located within an extensive area of glacial lake bed north of Upper Red Lake in northern Minnesota. The Big Bog contains some of the best representative expanses of continuous, patterned peatlands in the contiguous United States.

- Red Lake River/Zah Gheeng Marsh Projects. Originally enacted in 1951 to control agricultural flooding, the US Army Corps of Engineers, Clearwater County and Red Lake Tribal Council continue work towards improved operation of control structures, control structure modification, dike removal, channel remeandering, fishway construction, and marsh restoration.

*** Have a watershed project you'd like to see included? Submit suggestions online @ http://www.mn.nrcs.usda.gov/technical/rwa/**

Conservation Districts, Organizations & Partners

- **Beltrami County SWCD**
  3217 Bemidji Ave N Ste 3 Bemidji, MN 56601-4328
  Phone 218-755-4339

- **Clearwater County SWCD**
  312 Main Ave N Ste 3 Bagley MN 56621
  Phone 218-694-6227

- **Koochiching County SWCD**
  715 4th St International Falls, MN 56649
  Phone 218-283-1174

- **International Joint Commission Great Lakes Office**
  100 Ouellette Ave., 8th Floor Windsor, ON N9A 6T3
  Phone: 519-257-6733

- **International Water Institute**
  1805 Research Park Drive NDSU
  Fargo, ND 58102 Phone: 701-231-5266

- **Itasca County SWCD**
  1889 E Hwy 2, Grand Rapids, MN 55744.
  Phone 218-326-0017

- **Land Stewardship Project**
  14758 Ostlund Trail N. Marine, MN 55047
  Phone 612-433-2770

- **Northwest Minnesota Comprehensive Local Water Planning Joint Powers Board (JPB)**
  PO Box 16 Grygla, MN 56727 (218) 294-6142

- **Red Lake Department of Natural Resources**
  Box 279 Red Lake, MN 56671
  Phone 218-679-3959 Fax: 218-679-2830

- **Red River Water Management Consortium**
  15 North 23rd Street PO Box 9018
  Grand Forks, ND 58202-9018 (701) 777-5000

- **Red River Basin Commission**
  119 S. 5th St, PO Box 66 Moorhead, MN 56560
  Phone: 218-291-0422

- **Upper Red Lake Area Association**
  P.O. BOX 407 WASKISH, MN. 56685
  Phone: 218 647-8913

Footnotes / Bibliography

1. Ownership Layer – Source: MN Stewardship Data: Minnesota Department of Natural Resources, Section of Wildife, BRW, Inc, 2007. This is the complete GAP Stewardship database containing land ownership information for the entire state of Minnesota. Date of source material is varable and ranges from 1976 to 2007, although a date range of 1983 to 1985 predominates. Land interest is expressed only when some organization owns or administers more than 50% of a forty except where DNR could create sub-forty accuracy polygons.

2. National Land Cover Dataset (NLCD) - Originator: U.S. Geological Survey (USGS); Publication date: 19990631; Title: Minnesota Land Cover Data Set, Edition: 1; Geospatial data presentation form: Raster digital data; Publisher: U.S. Geological Survey, Sioux Falls, SD, USA.

3. Ownership layer classes grouped to calculate Public ownership vs. Private and Tribal ownership by Minnesota NRCS Rapid Watershed Assessment Staff.Land cover / Land use data was then extracted from the National Landcover Dataset Classification System and related to ownership class polygons.

4. USGS 1:100,000 Hydrography Layer .This data set represents all features coded as 'rivers' on the USGS 1:100,000-scale DLG Hydrography data set. This current version was converted to ARC/INFO by the Land Management Information Center and edge-matched across map sheet boundaries. Minnesota DNR made further modifications to the files, verified lake feature identifiers, and created a state layer from the separate 100k data. The Hydro 100k layer was compared to MPCA's 303(d) data to derive percentage of listed waters.

5. Land Cover / Land Use / Hydro 100k Buffer. Using the 100k Hydrology dataset, All streams within HUC were spatially buffered to a distance of 100 ft. National Landcover Dataset attributes were extracted for the spatial buffer to demonstrate the vegetation and landuse in vulnerable areas adjacent to waterways.

6. Land Capability Class. ESTIMATES FROM THE 1997 NRI DATABASE (REVISED DECEMBER 2000) REPLACE ALL PREVIOUS REPORTS AND ESTIMATES. Comparisons made using data published for the 1982, 1987, or 1992 NRI may produce erroneous results. This is because of changes in statistical estimation protocols and because all data collected prior to 1997 were simultaneously reviewed (edited) as 1997 NRI data were collected. All definitions are available in the glossary. In addition, this December 2000 revision of the 1997 NRI data updates information released in December 1999 and corrects a computer error discovered in March 2000. For more information: http://www.nrcs.usda.gov/technical/NRI/

7. 1997 NRI Irrigated Land Estimates. Irrigated land: Land that shows evidence of being irrigated during the year of the inventory or during two or more years out of the last four years. Water is supplied to crops by ditches, pipes, or other conduits. Water spreading is not considered irrigation; it is recorded as a conservation practice. [NRI-97] For more information: http://www.nrcs.usda.gov/technical/NRI/

8. 303(d) Stream data. Minnesota's Final Impaired Waters (per Section 303(d) Clean Water Act), 2006. Data obtained from Minnesota Pollution Control Agency (MPCA). The Minnesota Pollution Control Agency (MPCA) helps protect state water by monitoring quality, setting standards and controlling inputs through the development of TMDL plans. http://www.pca.state.mn.us/water/tmdl/index.html#maps.

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Footnotes / Bibliography (continued)

9. National Coordinated Common Resource Area (CRA) Geographic Database. A Common Resource Area (CRA) map delineation is defined as a geographical area where resource concerns, problems, or treatment needs are similar. It is considered a subdivision of an existing Major Land Resource Area (MLRA) map delineation or polygon. Landscape conditions, soil, climate, human considerations, and other natural resource information are used to determine the geographic boundaries of a Common Resource Area

10. Soil Survey Geographic Database (SSURGO) Tabular and spatial data obtained from NRCS Soil Data Mart at http://soildatamart.nrcs.gov. Publication dates vary by county. Component and layer tables were linked to the spatial data via SDV 5.1 and ARCGIS 9.1 to derive the soil classifications presented in these examples. Highly Erodible Land Classification Data obtained from USDA/NRCS EFOTG Section II, County Soil Data. HEL classifications were appended to SSURGO spatial data via an ARCEdit session. Addendum and publication dates vary by county.

11. Lands removed from production through farm bill programs. County enrollment derived from the following: CRP Acres: www.fsa.usda.gov/crpstorpt/07Approved/r1sumyr/mn.htm (7/30/04). CREP Acres: http://www.bwsr.state.mn.us/easements/crep/easementsummary.html (7/31/03). WRP Acres: NRCS (8/16/04). Data were obtained by county and adjusted by percent of HUC in the county.

12. Socioeconomic and Agricultural Census Data were taken from the U.S. Population Census, 2000 and 2002 Agricultural Census and adjusted by percent of HUC in the county or by percent of zip code area in the HUC, depending on the level of data available. Unemployment statistics obtained from the Bureau of Labor Statistics - Labor Force Data by County, 2006 Annual Averages http://www.bls.gov Data were also taken from MPCA AFO/CAFO counts provided by county for 2005.

13. 1997 NRI Estimates for sheet and rill erosion (WEQ & USLE). The NRI estimates sheet and rill erosion together using the Universal Soil Loss Equation (USLE). The Revised Universal Soil Loss Equation (RUSLE) was not used in the 1997 NRI. RUSLE was not available for previous inventories, therefore the use of USLE was continued to preserve the trending capacity of the NRI database. Wind erosion is estimated using the Wind Erosion Equation (WEQ). For further information visit http://www.mn.nrcs.usda.gov/technical/nri/findings/erosion.htm

14. Federally listed endangered and threatened species counts obtained from NRCS Field Office Technical Guide, Section II, Threatened and Endangered List. http://www.nrcs.usda.gov/Technical/efotg/. Essential fish habitat as established by Magnuson-Stevens Fishery Conservation and Management Act, Public Law 94-265, as amended through October 11, 1996 http://www.nmfs.noaa.gov/sfa/magact/

15. Watershed Projects, Plans, Monitoring. Natural Resources Conservation Service, Watershed Projects Planned and Authorized, http://www.nrcs.usda.gov/programs/watershed/Purpose. US Army Cops of Engineers http://www.mvp.usace.army.mil/environment/

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